The Genevac Mega 980 &1200 Max Evaporation Systems

User Manual

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Part Number 04-4542

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These operating instructions should be read before you use the Genevac Mega Evaporating System.

Keep them near the system for easy reference.

Your attention is drawn in particular to Section 4 Safety.

1 Introduction

The Genevac Series II range of evaporation systems are state-of-the art and represent a significant step forward in evaporation technology for the R&D laboratory.

Drawing on extensive experience in the drug discovery field, the Mega systems are designed to provide very high performance coupled with ease of use.

As you will discover, the system is simple to set up, easy to operate and very flexible.

The status of the system is displayed and controlled on a single keypad, display module indicating the run time, the vacuum, rotor temperature and chamber temperature on digital displays.

Simple to use up-down controls enable the run time, rotor and chamber temperatures to be set in an instant and single push buttons set the other functions.

This manual will guide you through the start up requirements, set up needs and operation of the system to facilitate the most efficient procedure to protect your product's integrity and to ensure optimum performance at all times.

Amendment Control Form

Issue	Reason for Change	Date Issued
1	Change to EU Declaration of Conformity	21 September 2004
2-2	Update U.S. address	24 October 2008

1.1 Safety symbols

The following safety symbols are used throughout this manual. The definitions and scope of each symbol is as described below.

WARNING

THIS SYMBOL INDICATES HAZARDS THAT CAN LEAD TO SERIOUS MATERIAL DAMAGE OR POTENTIAL SERIOUS INJURY.

Caution

This symbol provides information about hazards that can be harmful to your health or lead to material damage.

Note

This symbol provides information about technical requirements, which if not followed, can lead to malfunctions, inefficiency and reduced productivity.

This symbol indicates that there may be a risk to sample integrity.

Genevac Evaporators and Combustible Solvents

Please note it remains the responsibility of the user to consider safety when evaporating any combustible solvents and ensure the system is placed in a well ventilated environment. Genevac's position regarding evaporation of such solvents, particularly with respect to the European ATEX directive, is available on our website or from your local sales representative.

IMPORTANT
THIS SYSTEM MUST BE EARTHED – SEE PAGE 42

2 System description and options

Your Mega Evaporation System is comprised of an evaporation chamber and rotor, combined with a cryopump-condenser unit.

Vacuum is provided by the Scroll Pump (although other types of vacuum pumps can be used).

Solid-state case heaters and Coolheat radiant lamps heat the chamber and samples.

The control of chamber, bucket and sample temperature, vacuum ramping rate, chamber pressure, rotor speed and run time are all handled by an embedded PC.

For the first time the end user has the facility to auto program run parameters for any (recognised) solvent/mixture entered. These optimised run parameters are highlighted in Cyan on the display screen, when this **Auto Program** facility has been selected.

Recognised Solvent(s) available from drop down menu.

Sample Holder type available from drop down menu.

Scroll pump

The **Run Progress** screen now has a fully featured graphical display, providing annotated plots for temperature and pressure (now a log scale).

The control software enables the user to specify and store a library of up to 100 different evaporation profiles in an uncomplicated manner.

Run profiles can also be linked to provide multi stage runs. Up to 100 different profile steps can be linked and iterative loops can also be programmed.

With a maximum single run time of just below 100 hours, the system is extremely flexible to meet every requirement.

3 Scope of delivery and installation

You will have purchased your system with or without the option of commissioning by Genevac personnel.

Reference will be made in the following notes to the installation procedures required to cover these options.

On delivery, it is advisable to unpack your system at the point of receipt, to ease the movement of the component parts to the point of use.

3.1 Checking the delivery

Check the contents of the delivery as soon as possible against the delivery note and notify Genevac Ltd immediately of any missing or damaged parts. (Refer to section 13 for contact details).

3.2 Arranging commissioning

If your system is to be delivered separately, Genevac Ltd will contact you prior to the delivery, to agree a date to commission your system.

3.3 Training

Commissioning will normally include training in the basic operation of the System. Further in house training is recommended to fully exploit the flexibility of the system.

THE EVAPORATOR MUST NOT BE OPERATED BY PERSONNEL WHO LACK THE TRAINING OR PROFESSIONAL EXPERIENCE TO COMPREHEND THE HAZARDS THAT CAN ARISE WHEN USING THE SYSTEM.

Personnel without such training require thorough instruction. These operating instructions should form the basis of this instruction.

3.4 Positioning the evaporator

POSITION THE EVAPORATOR AT LEAST 300 MM AWAY FROM THE EDGE OF A BENCH AND THE SAME DISTANCE CLEAR OF BREAKABLE OBJECTS OR AREAS WHERE ENTRAPMENT COULD OCCUR.

4 Safety

BEFORE OPERATING THE SYSTEM, IT IS IMPORTANT THAT THE FOLLOWING NOTES ARE READ TO ENSURE THAT THE IMPLICATIONS TO THE SAFETY OF PERSONNEL OPERATING THE SYSTEM AND FOR THE PROTECTION OF SAMPLE INTEGRITY ARE UNDERSTOOD.

Samples in the chamber are subjected to accelerations of up to 450G with a maximum load capacity of 9.6 kg per swing for a Mega 980 Max and 17.8kg for a Mega 1200 Max.

The following precautions should therefore always be observed:

- **There are important safety and operational considerations to be made when positioning the system.**
- **Refer to Section 9 Technical Data for recommended clearances**

4.1 Safe loading of rotor

MEGA 980 Max
9.6kg MAX including adaptor plate tubes, solvent, sample, sample holder BUT excluding the swing

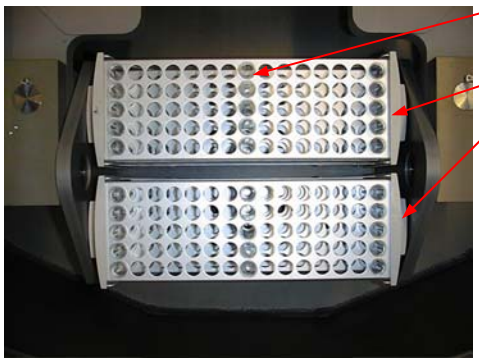
For a **Mega 980 Max** never exceed the maximum load capacity of 9.6kg per swing.

MEGA 1200 Max
17.8kg MAX including adaptor plate tubes, solvent, sample, sample holder BUT excluding the swing

For a **Mega 1200 Max** never exceed the maximum load capacity of 17.8kg per swing.

Balance pairs of sample holders that are loaded opposite each other to within 10g (+/- 5g).

Note that over a maximum imbalance, as specified in the Technical Data, the evaporator will cut out.



Locate tubes correctly in tube holders.

Locate sample blocks correctly in sample swings.

Load two or four tube holders in opposite and balanced configurations.

Distribute tubes in sample holders symmetrically.

Always evenly distribute the tubes in the sample holders.

Rotate the rotor by hand after loading and check that all tube holders and plates are correctly located before starting a run and before re-starting an interrupted run.

Do not load tubes or vials into sample holders other than those types that have been approved by Genevac Ltd.

Do not use sample holders that have not been supplied with system without consulting Genevac Service.

Genevac Ltd will accept no responsibility for any loss or damage incurred by improperly or excessively loaded rotors.

4.2 Safe Lid operation

The lid is opened and closed automatically by an electric actuator.

To open the lid, select **OPEN** on the **LID DIRECTION** switch and press both **OPERATE** switches simultaneously until the lid is sufficiently or fully opened.

BEFORE CLOSING THE LID, ALWAYS ENSURE THAT ALL PERSONNEL AND OBJECTS LIKELY TO BE ENTRAPPED ARE CLEAR OF THE LID AND MATING SURFACES, PARTICULARLY IN THE AREA OF THE HINGE.

To close the lid, select **CLOSED** on the **LID DIRECTION** switch and press both **OPERATING** switches simultaneously until the lid is fully closed.

Note that the system will not operate if the lid is not fully closed.

4.3 Limitations of use

Your Mega Series II evaporating system is **unsuitable** for use under the following circumstances.

- With strong mineral acids such as HCl and HBr at all concentrations, unless specifically built to order.
- For use as a pressure vessel.

5 Getting started

The following notes describe the basic start up, set up and run instructions for your Mega evaporating system.

5.1 How to switch on the pump

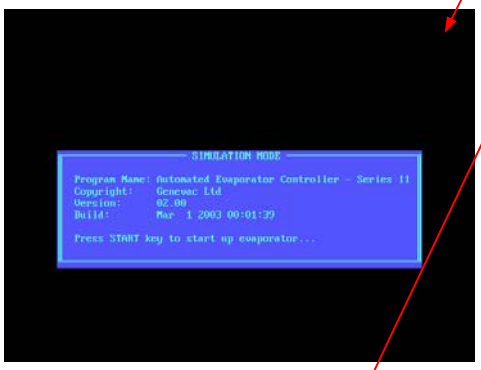
Switch the pump mains switch on.

5.2 How to switch on the evaporator

Switch the mains switch on.

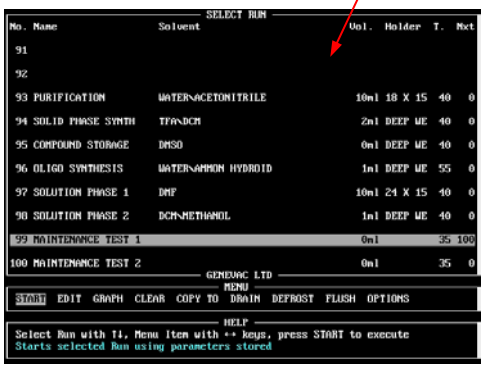
The screen will display the **Software Control** screen.

Press the **START** key on the keyboard to access the **Select Run** screen.


SIMULATION MODE
Program Name: Automated Evaporator Controller - Series II
Copyright: Genevac Ltd
Version: 02.00
Build: Mar 1 2003 00:01:39
Press START key to start up evaporator...

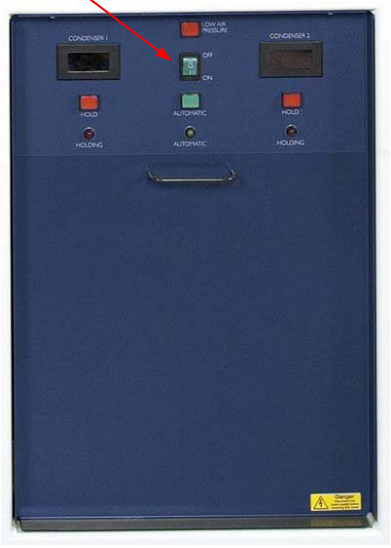
The **Select Run** screen will load up at the last run that was used.

The system will not be available for use until the vacuum pump has reached the correct operating temperature.


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
91
92
93 PURIFICATION WATER\ACETONITRILE 10ml 18 X 15 40 0
94 SOLID PHASE SYNTH TFA\DCM 2ml DEEP WE 40 0
95 COMPOUND STORAGE DMSO 0ml DEEP WE 40 0
96 OLIGO SYNTHESIS WATER\AMMON HYDROID 1ml DEEP WE 55 0
97 SOLUTION PHASE 1 DMF 10ml 24 X 15 40 0
98 SOLUTION PHASE 2 DCM\METHANOL 1ml DEEP WE 40 0
99 MAINTENANCE TEST 1 0ml 35 100
100 MAINTENANCE TEST 2 0ml 35 0
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with T1, Menu Item with ++ keys, press START to execute
Starts selected Run using parameters stored

5.2 How to switch on the evaporator

Switch the mains switch on.



There will be a slight delay until the condenser reaches the correct temperature.

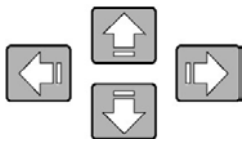
5.4 Using the keypad

The Series II keyboard controls and displays have been designed for ease and simplicity in use.

The keyboard has the most used function keys on the left hand side.

The right side illuminates when the **RUN DATA** screen is accessed.

The **START** and **STOP** keys start and stop a selected run.



The **cursor direction keys** move you around the screen in the direction of the arrows.

The **ENTER** key is used to 'open' and 'close' a field on the **Run Data** screen when inputting or amending data.

Note that the **START** key also acts as an **ENTER** key when the keyboard is not illuminated.

MENU

Operating the **MENU** key displays the **USER MENU** screen ***only*** when the rotor is not spinning and the chamber is vented.

DISPLAY

Operating the **DISPLAY** key displays the **RUN LOG** screen ***only*** when a run is in progress or has finished.

SETTINGS

Operating the **SETTINGS** key displays the **RUN DATA** screen ***only*** for the selected run.

Note that the **RUN DATA** screen can also be accessed from the menu **VIEW/EDIT DETAILS** option on the **SELECT RUN** screen when a run is ***not*** in progress.

The following notes describe the function of each of each screen and provides an explanation of the prompts displayed.

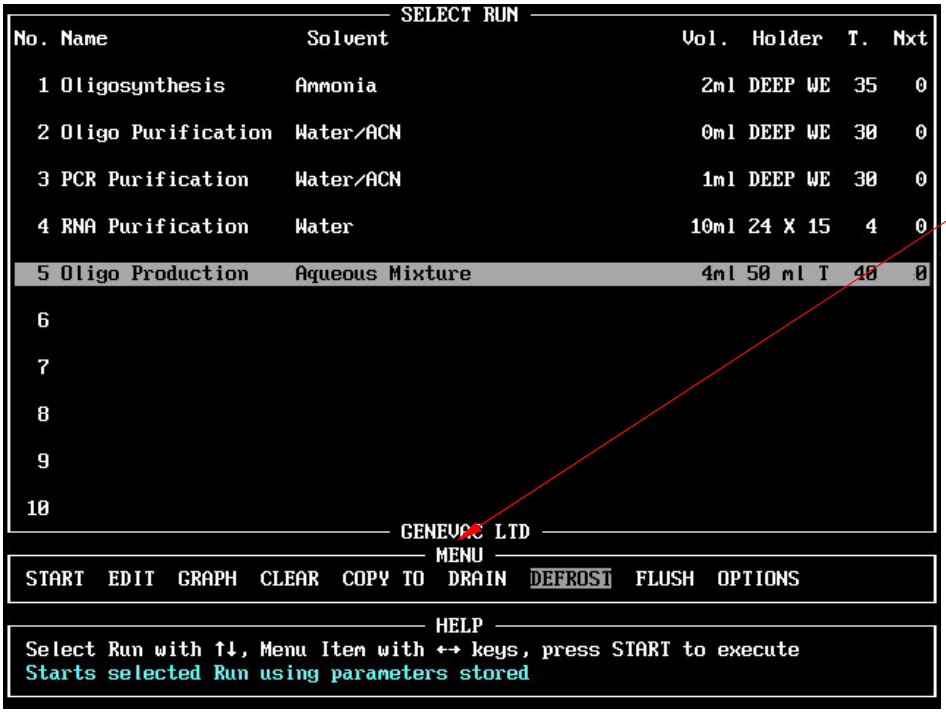
5.5 What the screens do

There are three main control screens.

The **SELECT RUN** screen lists the library of evaporation profiles you can choose.

This screen has the capacity to store 100 different profiles, from which you can select a particular run or set of runs.

The screen is accessed after switching on the pump and evaporator and by pressing the **START** key on the keyboard.


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
1 Oligosynthesis Ammonia 2ml DEEP WE 35 0
2 Oligo Purification Water/ACN 0ml DEEP WE 30 0
3 PCR Purification Water/ACN 1ml DEEP WE 30 0
4 RNA Purification Water 10ml 24 X 15 4 0
5 Oligo Production Aqueous Mixture 4ml 50 ml T 40 0
6
7
8
9
10
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with ↑↓, Menu Item with ↔ keys, press START to execute
Starts selected Run using parameters stored

- You store and select your runs on these screens.
- Use the UP and DOWN cursor keys to move between profiles.

By moving across the horizontal menu bar,

- You can **START** a run.
- You can **VIEW** and **EDIT** a profile.
- You can **CLEAR** a profile.
- You can **COPY** a profile.
- Start to **DRAIN**.
- Start to **DEFROST**.
- Start to **FLUSH**. (If Option Fitted)
- Adjust your **OPTIONS**.

The 100 profiles are shown on this and nine other screens.

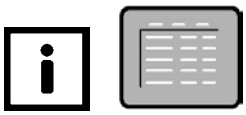
The other screens can be accessed quickly by moving the cursor down to the last entry on the page and pressing the down cursor key.

This will take you to the last entry on the next page. Alternatively, use the up cursor key.

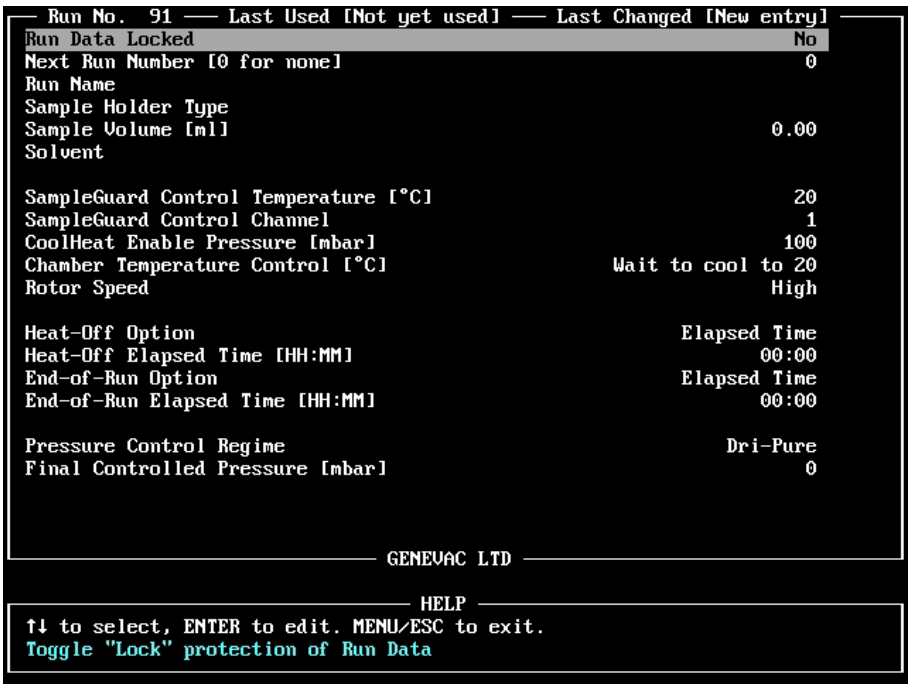
Each line on the **SELECT RUN** screen is generated from the **RUN DATA** screen.

When the chamber is vented and the rotor stationary, this screen is accessed by selecting **VIEW/EDIT** at the foot of the **SELECT RUN** screen and pressing **START**.

When the system is running, the **RUN DATA** screen can be accessed directly by pressing the **SETTINGS** key.

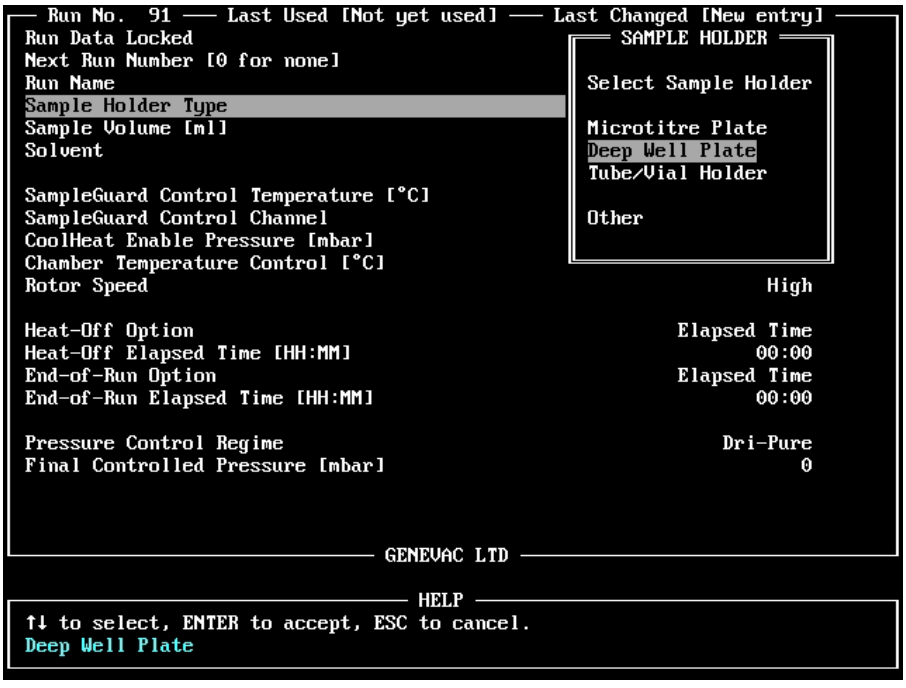


SETTINGS


Run No. 91 — Last Used [Not yet used] — Last Changed [New entry]
Run Data Locked No
Next Run Number [0 for none] 0
Run Name
Sample Holder Type
Sample Volume [ml] 0.00
Solvent
SampleGuard Control Temperature [°C] 20
SampleGuard Control Channel 1
CoolHeat Enable Pressure [mbar] 100
Chamber Temperature Control [°C] Wait to cool to 20
Rotor Speed High
Heat-Off Option Elapsed Time
Heat-Off Elapsed Time [HH:MM] 00:00
End-of-Run Option Elapsed Time
End-of-Run Elapsed Time [HH:MM] 00:00
Pressure Control Regime Dri-Pure
Final Controlled Pressure [mbar] 0
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Toggle "Lock" protection of Run Data

- Use the UP and DOWN cursor keys to move between fields.
- Press ENTER to 'open' a field, make the entry and press ENTER again to 'close' the field.
- During a run, you access this screen by pressing the SETTINGS key.
- You can edit any parameter during a run in this way.
- Toggle **Run Data Locked** to protect your data.

Please note that Main Menu order has changed. It now reads: Sample Holder Type, Sample Volume, Solvent

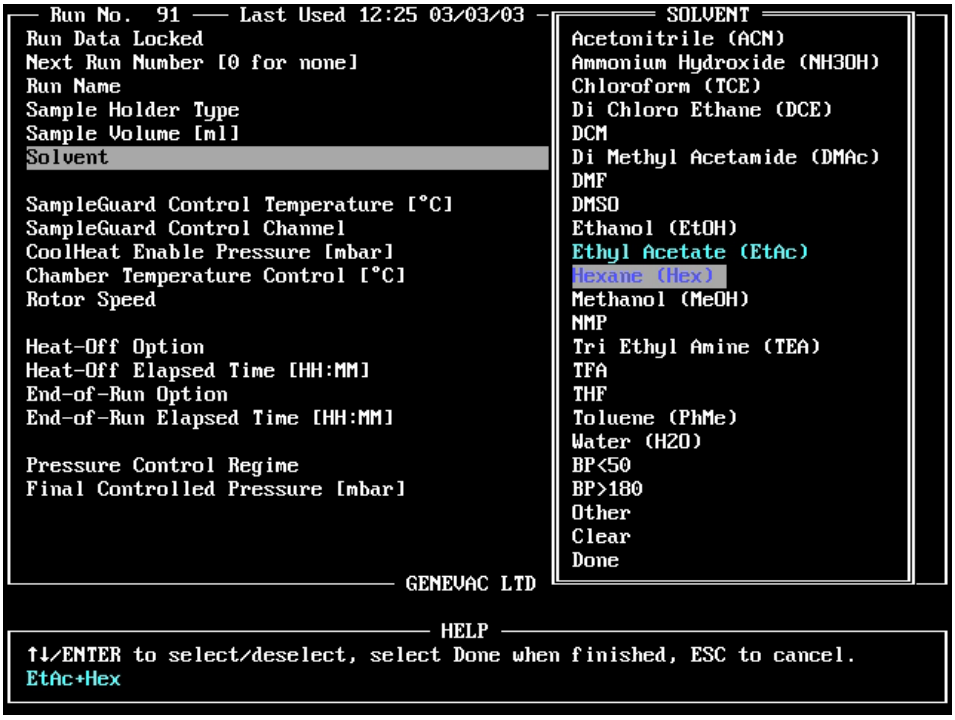


Sample Holder Type

- When selected you are presented with the SAMPLE HOLDER menu.
- Use Cursor keys to move up and down.
- Press ENTER to select.
- Select your sample holder type or if not defined, select **Other** and enter the details.

Sample Volume

- Select and enter value(s).



Solvent

When you select this field you are given a list of solvent types that have already been programmed into the evaporator.

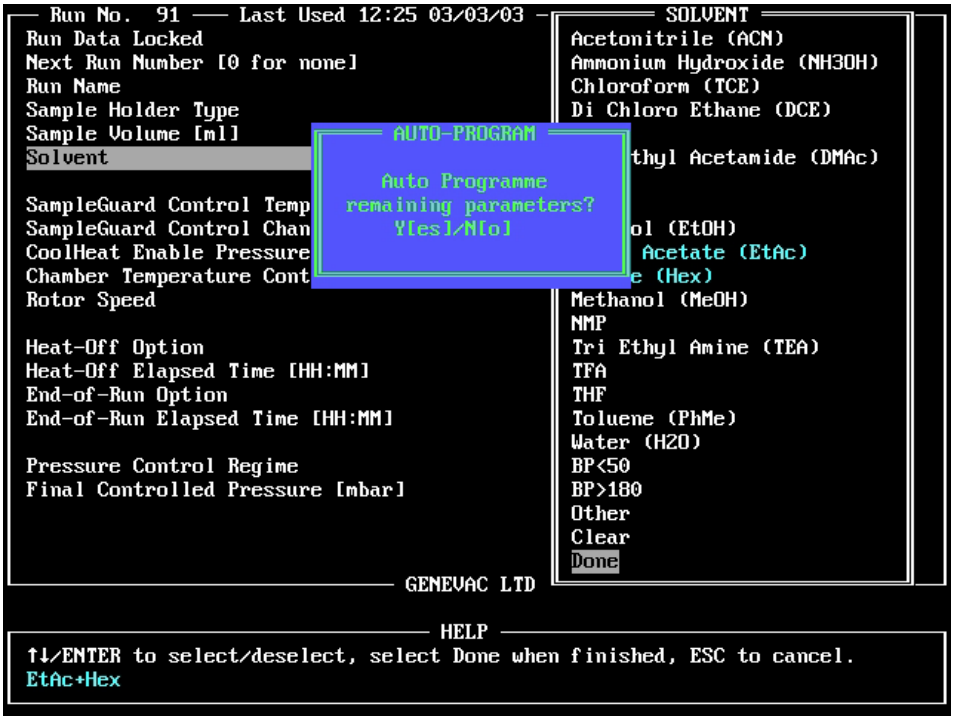
Use cursor keys to move up and down.

Press ENTER key to select (Highlighted in blue).

Please note that the solvent(s) that you have selected from the menu appear in the bottom left corner of the screen.

Select **Done** when finished.

Once your selection has been made you are now given a **new** option to **Auto Program** the remaining run parameters.

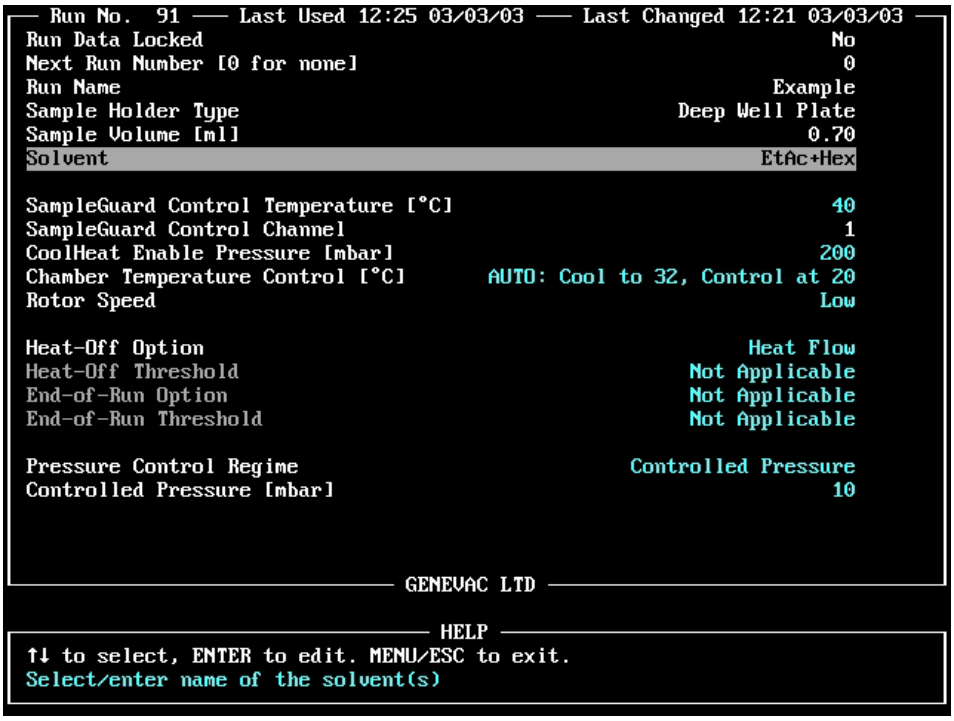


Press **Y** to accept **Auto Program**.

If you have entered an unrecognised solvent by selecting **Other** from the solvent menu, you will not be presented with the option to **Auto Program**.

Genevac and the ATEX Directive:

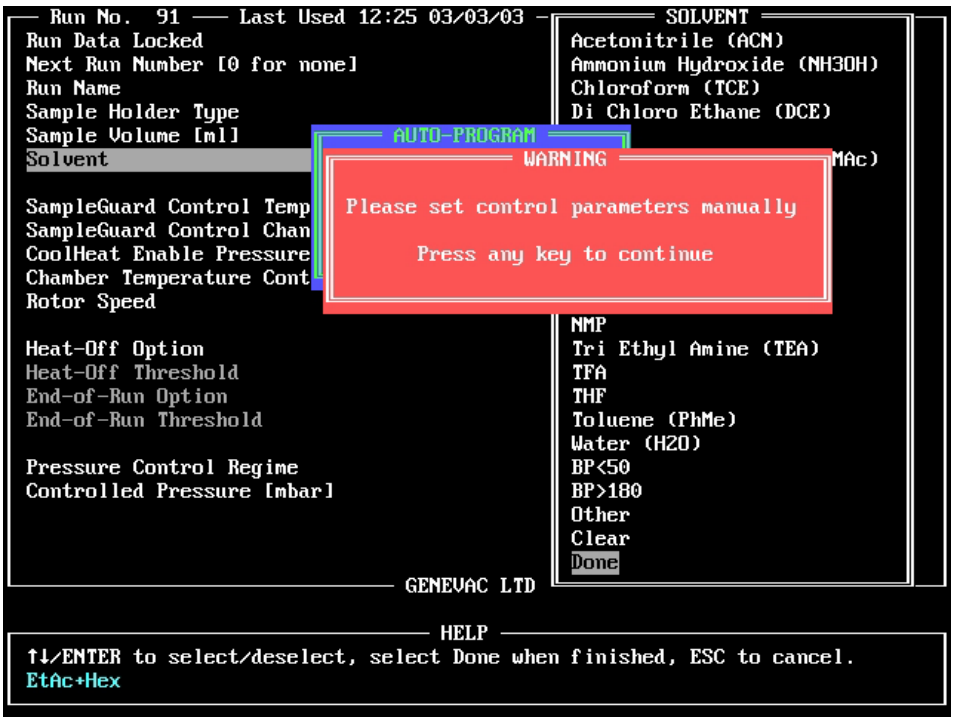
Please note that it remains the responsibility of the user to consider any solvents being evaporated within the context of the ATEX directive. The presence of solvents on the list above indicates only that they will not damage the system. If further information is required, please contact your Sales Representative or visit http://www.genevac.com/


Run No. 91 Last Used 12:25 03/03/03 Last Changed 12:21 03/03/03
Run Data Locked No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.70
Solvent EtAc+Hex
SampleGuard Control Temperature [°C] 40
SampleGuard Control Channel 1
CoolHeat Enable Pressure [mbar] 200
Chamber Temperature Control [°C] AUTO: Cool to 32, Control at 20
Rotor Speed Low
Heat-Off Option Heat Flow
Heat-Off Threshold Not Applicable
End-of-Run Option Not Applicable
End-of-Run Threshold Not Applicable
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 10
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Select/enter name of the solvent(s)

With **Auto Program Y[es]** selected.

The screen will now display the **Auto Programm**ed data in Cyan (Light Blue).

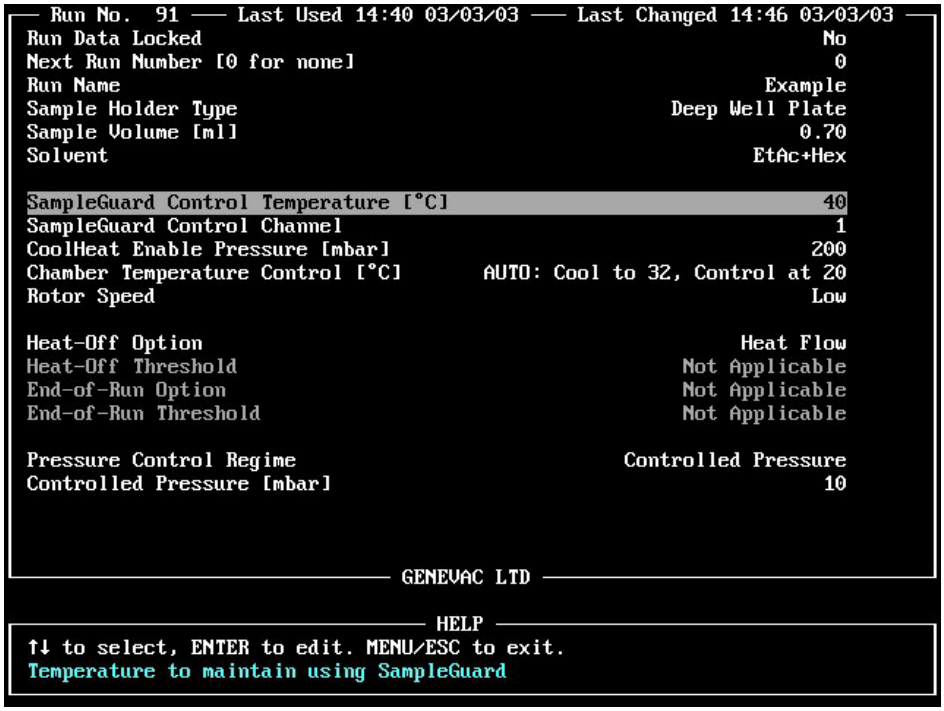
Save Run and continue



If you did not select **Auto Program** or were not given the option, due to inputting an unrecognised solvent, then you will be presented with this screen.

If editing an existing run, parameters will remain as previous settings.

If creating a new run, parameters will be set to safe default settings.


Run No. 91 — Last Used 14:40 03/03/03 — Last Changed 14:46 03/03/03
Run Data Locked No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.70
Solvent EtAc+Hex
SampleGuard Control Temperature [°C] 40
SampleGuard Control Channel 1
CoolHeat Enable Pressure [mbar] 200
Chamber Temperature Control [°C] AUTO: Cool to 32, Control at 20
Rotor Speed Low
Heat-Off Option Heat Flow
Heat-Off Threshold Not Applicable
End-of-Run Option Not Applicable
End-of-Run Threshold Not Applicable
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 10
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Temperature to maintain using SampleGuard

SampleGuard Control Temperature

Set within the range of -20 to 70°C.

SampleGuard Control Channel

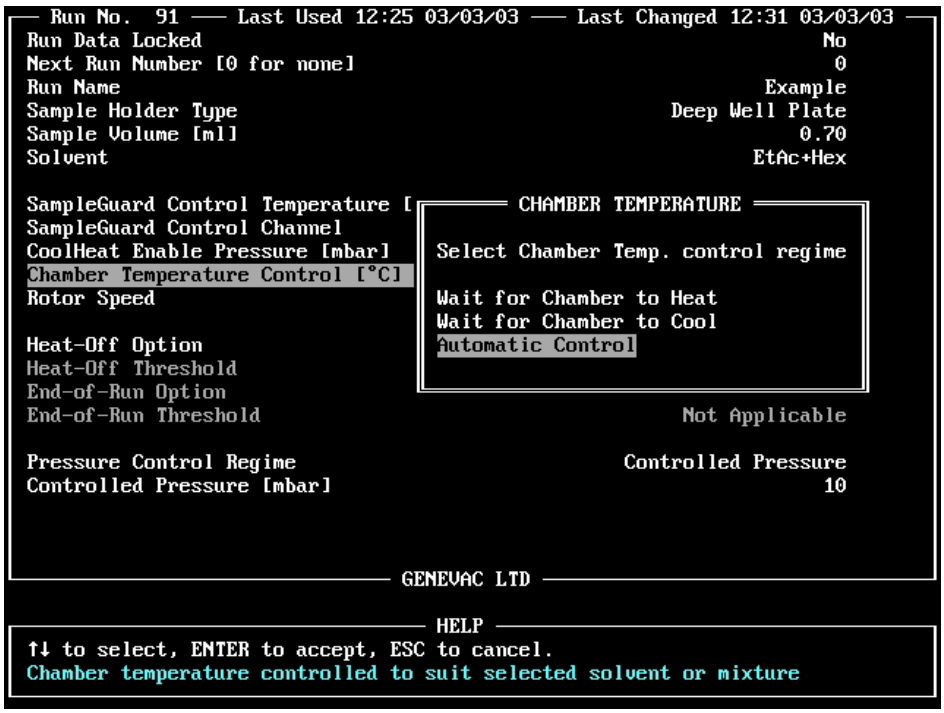
Channel 1 in Swing or Sample Holder.

Channel 2 in Sample.

Coolheat Enable Pressure

Set within the range of 5–400 mbar.

.


Run No. 91 — Last Used 12:25 03/03/03 — Last Changed 12:31 03/03/03
Run Data Locked No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.70
Solvent EtAc+Hex
SampleGuard Control Temperature [
SampleGuard Control Channel
CoolHeat Enable Pressure [mbar]
Chamber Temperature Control [°C]
Rotor Speed
Heat-Off Option
Heat-Off Threshold
End-of-Run Option
End-of-Run Threshold Not Applicable
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 10
CHAMBER TEMPERATURE
Select Chamber Temp. control regime
Wait for Chamber to Heat
Wait for Chamber to Cool
Automatic Control
GENEVAC LTD
HELP
↑↓ to select, ENTER to accept, ESC to cancel.
Chamber temperature controlled to suit selected solvent or mixture

Chamber Temperature Control

There are now 3 options available:

Wait for Chamber to Heat

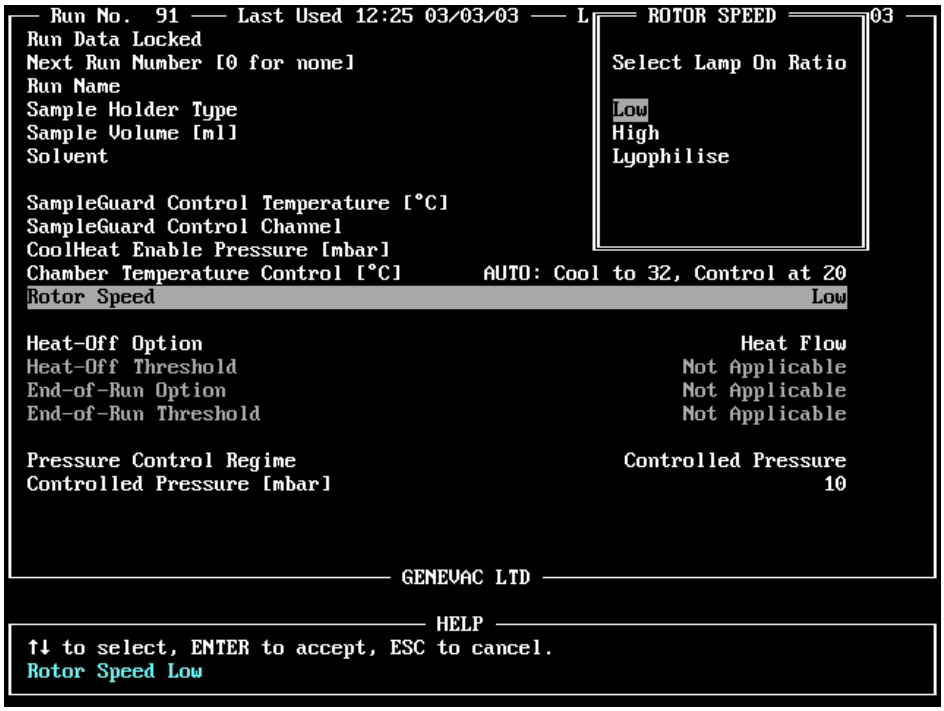
Range from 0°C to 45°C.

Wait for Chamber to Cool

Range from 0°C to 45°C.

Automatic Control

Temperature is automatically set to an optimised figure for the recognised solvent / mixture selected.



Rotor Speed

Low

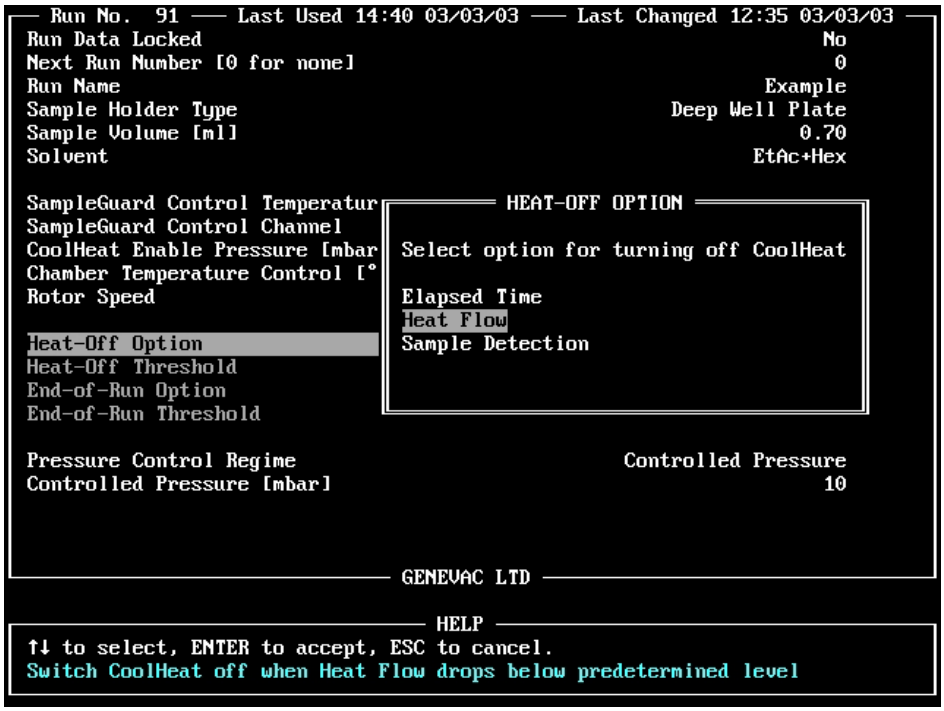
Rotor speed applies nominally 300 G.

High

Rotor speed applies nominally 500 G.

Lyophilise

Not currently available on a Mega.



Heat-Off Option

Elapsed Time

Press **ENTER** and input the time after which you want the lamps turned off.

This can be in a range of 0 (lamps off for the entire run) to 99 hours 59 minutes.

Heat Flow

Not currently available on a Mega.

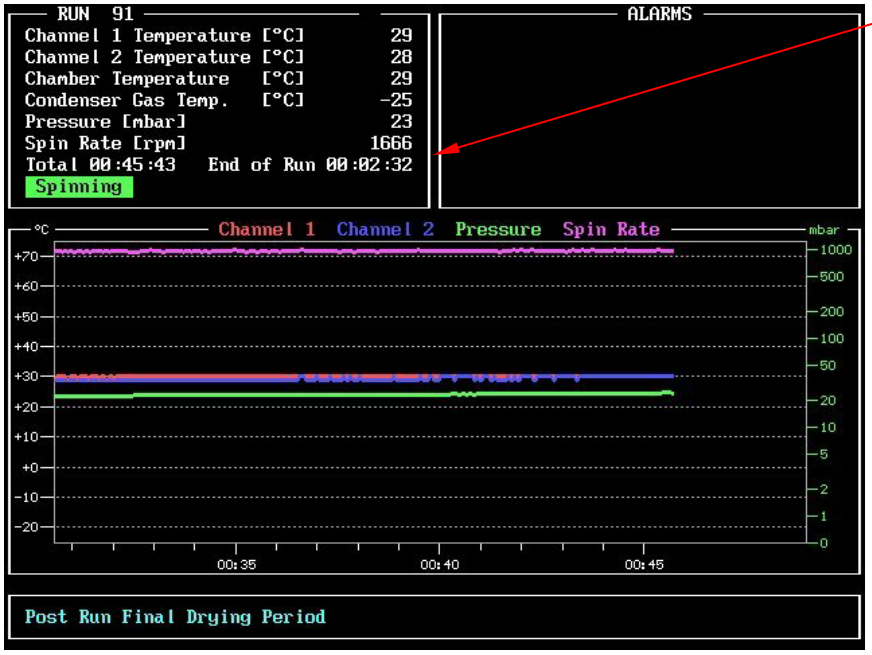
Sample Detection

Monitors the temperature difference between the 2 SampleGuard channels.

During a run

The main section of the **RUN LOG** screen, gives a graphical display of the real time changes in chamber pressure, spin rate, sample and sample holder temperatures.

The top left hand section, displays the current temperatures of channels 1 and 2, the chamber temperature, the condenser temperature, the chamber pressure, the total time elapsed and the stage time elapsed if linked runs are being undertaken.



Run finished press < > to view data.
any other key to end.

NOTE THE NEW GRAPHICAL DISPLAY.

- The RUN LOG screen displays the real time events.
- The top left block gives current values.
- The top right block displays any alarms.
- The block at the foot of the screen displays the current status of the system and Instructions.
- Pressure is plotted on log scale.
- Press STOP to terminate a run at any time.

When run enters final drying period the display changes to indicate the time left to **End of Run** or if linked runs **End of Stage**.

Press the **DISPLAY** key during a run to return to the **RUN LOG** screen.

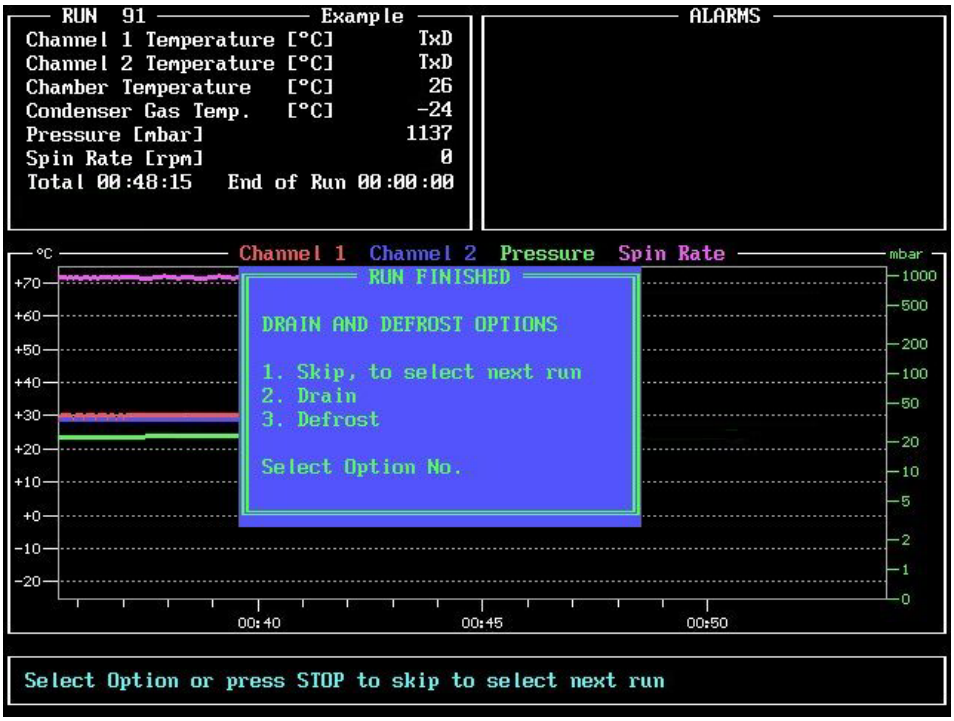
Operating the **STOP** key at any time during a run will terminate the run.

The chamber will vent and the rotor will start to spin down.

You will not be able to open the chamber until the chamber has reached atmospheric pressure and the rotor has stopped spinning.

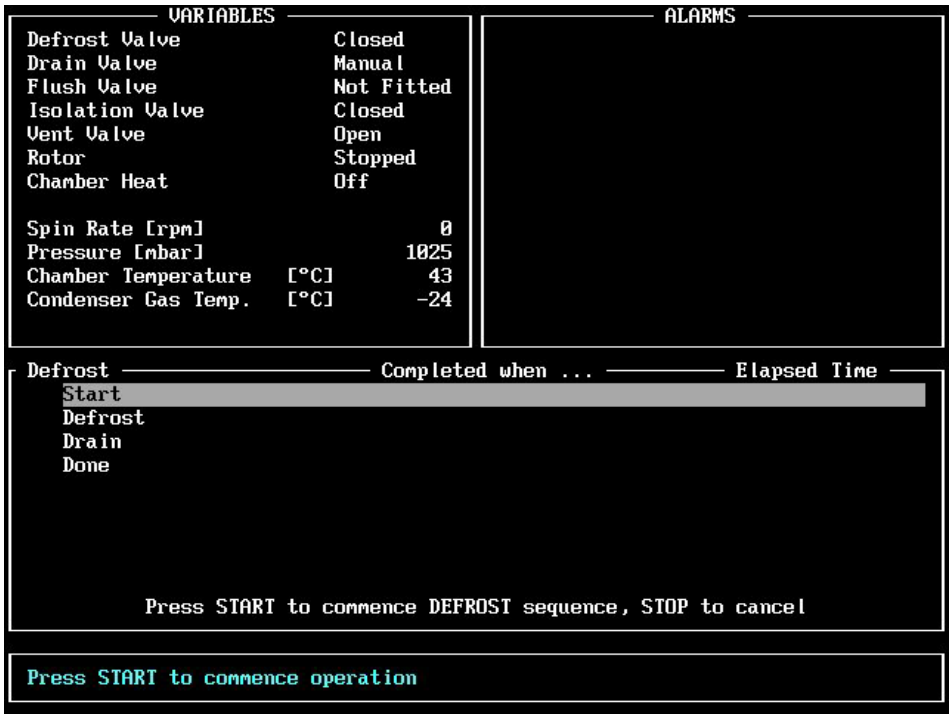
When the chamber has vented and the rotor stopped, you will be given this **STATUS** prompt.

When the run is finished, after pressing a key, the following screen is displayed.



Select the **DRAIN or DEFROST OPERATIONS** option using the numeric keys.

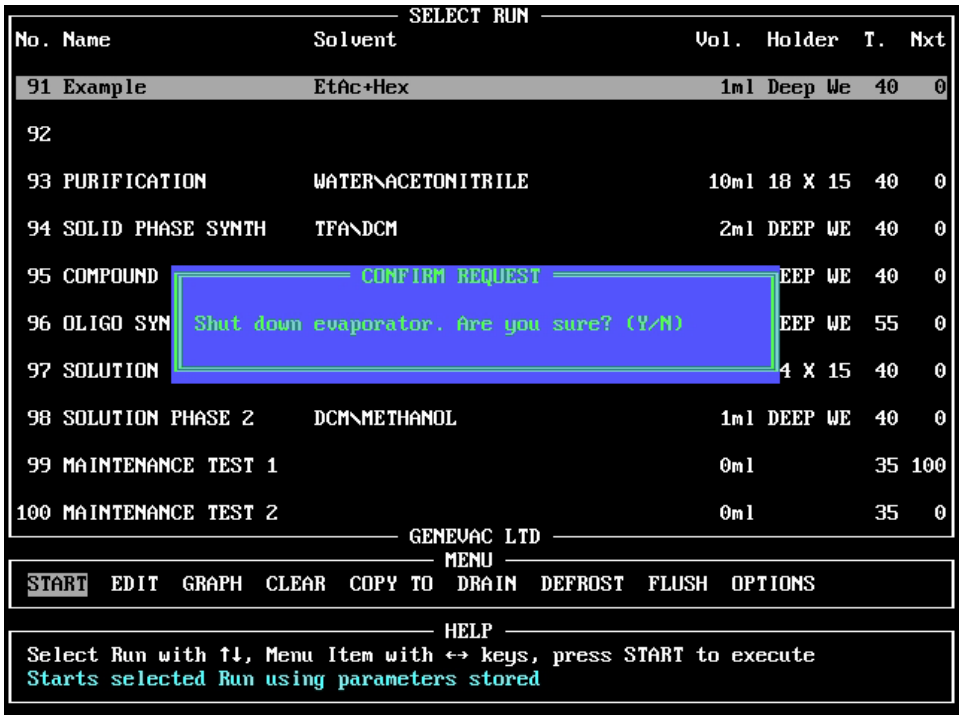
Press **ENTER** to display the **DRAIN or DEFROST MENU**.



- With the DEFROST CYCLE highlighted, press ENTER to start the defrost cycle.
- This will automatically open the defrost valve.
- Drain the condenser after every run and at the end of the day.
- A defrosted and drained condenser will operate more efficiently.
- Periodically check the level of solvent in the containers attached to the drains.

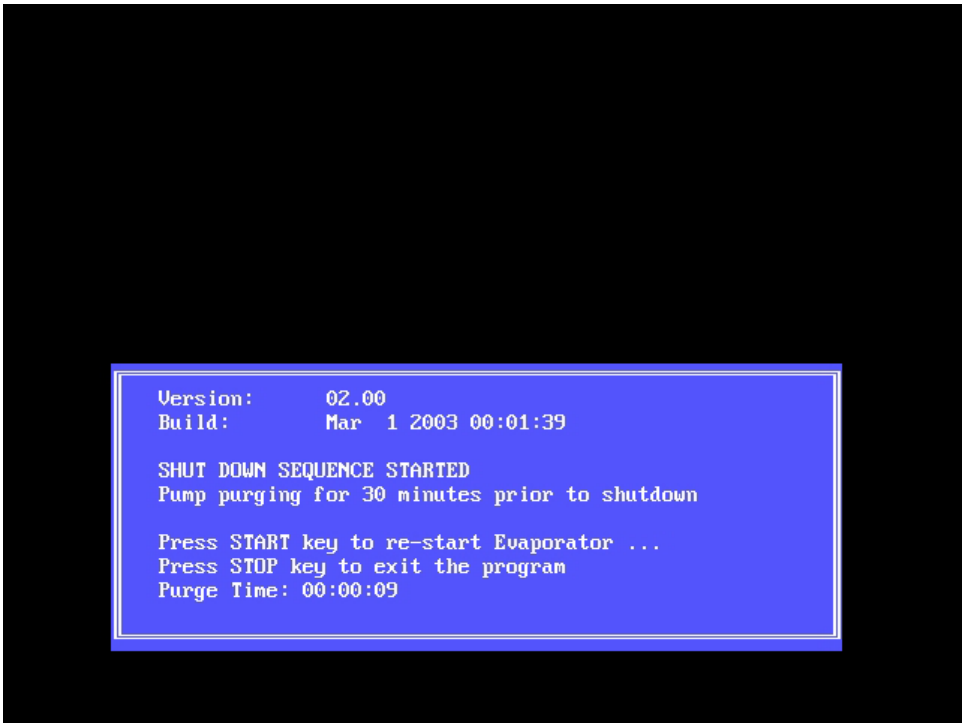
Screens similar to this are also displayed for **DRAIN** and, if fitted, the **FLUSH** option.

If you wish to end the work session on the system, go to the **Select Run** screen and press **STOP**.


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
91 Example EtAc+Hex 1ml Deep We 40 0
92
93 PURIFICATION WATER\ACETONITRILE 10ml 18 X 15 40 0
94 SOLID PHASE SYNTH TFA\DCM 2ml DEEP WE 40 0
95 COMPOUND EEP WE 40 0
96 OLIGO SYN EEP WE 55 0
97 SOLUTION 4 X 15 40 0
98 SOLUTION PHASE 2 DCM\METHANOL 1ml DEEP WE 40 0
99 MAINTENANCE TEST 1 0ml 35 100
100 MAINTENANCE TEST 2 0ml 35 0
CONFIRM REQUEST
Shut down evaporator. Are you sure? (Y/N)
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with ↑↓, Menu Item with ↔ keys, press START to execute
Starts selected Run using parameters stored

This prompt will be displayed on the **SELECT RUN** screen.

Press **Y** to close the system down or **N** to select another run.


Version: 02.00
Build: Mar 1 2003 00:01:39
SHUT DOWN SEQUENCE STARTED
Pump purging for 30 minutes prior to shutdown
Press START key to re-start Evaporator ...
Press STOP key to exit the program
Purge Time: 00:00:09

- The **SHUT DOWN** screen will be displayed when you select the **Y** response.
- The pump will be purged of solvent vapours for 30 minutes.
- You can restart the run by pressing **START** at any point.
- You can abort Shutdown by pressing **START** at anytime.
- If you want to start a different run, press **STOP**, select **N** and press **ESC** to display the **SELECT RUN** screen.

- The **USER MENU** is displayed by pressing the **MENU** key ***only*** when the chamber is vented and the rotor stationary.
- Lamp Layer Selection is not an option for the HT-4 or Mega.
- In Operator Controls you can adjust the screen brightness to suit your viewing angle.
- You can turn the audible warning off or on.
- Press **ESC** to leave this menu

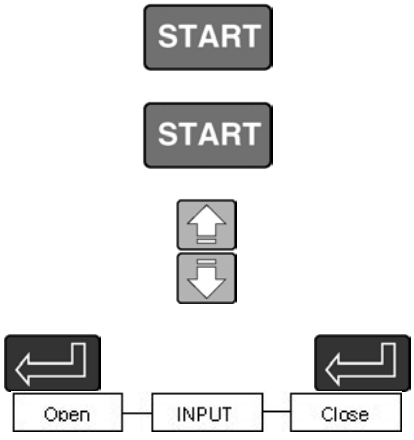
CONTROLS MENU
Adjust Screen Brightness
Keypress Beep On/Off Off
User Intervention Beeps On/Off Off
End of Run Beeps On/Off Off
GENEVAC LTD
HELP
↑↓ to move to required option, ENTER to select, ESC to leave this menu
Adjusts brightness and optimum screen viewing angle

Use the cursor keys to select the **OPERATOR CONTROLS** and press **ENTER**.

- Use the **UP** and **DOWN** cursor keys to adjust the screen brightness to suit your viewing angle.
- Toggle the beep **ON** or **OFF**.
- Press **ESC** to exit this screen.

5.6 How to enter control data

All control data is entered from the **RUN DATA** screen.



From start up of the system and the software control screen, press **START** to display the **SELECT RUN screen**.

Select the **VIEW/EDIT DETAILS** option and press **START** to display the **RUN DATA screen**.

Use the **UP** and **DOWN** cursor keys to move between fields.

Unless otherwise stated, press **ENTER** to 'open' a field, input your requirement and press **ENTER** again to 'close' the field.

Run Data Locked

When set to **Yes** this setting protects the run data from inadvertent corruption.

Press the **ENTER** key to toggle between **Yes** and **No**.

Note that you will **not** be able to make amendments or additions if the data is **locked**.

Lock the data after completing the run entry.

Next Run Number

This control enables you to link and loop runs in any sequence.

If you want to link runs, list the number of the run you want to follow the run you are entering.

Repeat this process for any subsequent runs you would like to link.

You can also loop a run.

The limitation of how many runs you can link will be either the maximum run time of 99 hours 59 minutes or 99 different steps.

Linked and looped runs can always be interrupted by manually stopping the system.

Use the **DOWN** cursor key to move to the next field.

Run Name

Enter the title of the run that should be no more than 20 characters long.

Use the **DOWN** cursor key to move to the next field.

Sample Holder Type

Press **ENTER** to display the **Select Sample Holder** drop down menu.

Use the **UP** and **DOWN** cursor keys to select the option and press **ENTER**.

If **OTHER** is selected, the description should be no more than 20 characters long.

Sample Volume

Press **ENTER** and input the volume in mls.

Solvent

Press **ENTER** to display the **Solvent** Drop down menu.

Use the **UP** and **DOWN** cursor keys to select the option(s) and press **ENTER.**

Once your selection has been made select **Done** and press **Enter**, you are now given a **new** option to **Auto Program** the remaining run parameters.

If **OTHER** is selected, the name should be no more than 31 characters long, press **ENTER** to return to **Solvent** drop down menu.

Select **Done** and press **ENTER**.

SampleGuard Control Temperature

Press **ENTER** and input the temperature you wish to limit the sample to during evaporation.

This can be in the range of 1 to +70° C.

Note that if not specified, the default setting is 30° C.

Sample Guard Control Channel

Press **ENTER** and input the channel on which you want to control temperature.

Channel 1 will normally be assigned to the probe in the sample holder and channel 2 to the probe in the sample.

Note that when powered down, this setting defaults to channel 1 as the control channel.

Coolheat Enable Pressure

Press **ENTER** and input the pressure below which you want the lamps to be turned on.

This can be in the range of 5-400 mbar.

If nothing is selected, the setting will default to 400 mbar.

Chamber Temperature Control

Press **ENTER** and Select the method from the 3 options displayed:

Wait for Chamber to Heat

Range from 0°C to 45°C.

Wait for Chamber to Cool

Range from 0°C to 45°C.

Automatic Control

Temperature is automatically set to an optimised figure for the recognised solvent / mixture selected.

Input the minimum temperature you want the chamber to reach before spin-up will commence.

Rotor Speed

Lyophilise is not available on a Mega

Press **ENTER** to display the **Select Rotor Speed** drop down menu.

Use the **UP** and **DOWN** cursor keys to select **Low** or **High** or **Lyophilise** (Not available on a Mega).

Low speed applies nominally 300 G and high speed nominally 500 G.

Selecting the **Dri-Pure** option described later will over-ride this option and sets **High**.

If nothing is selected, the setting will default to **LOW** speed.

Heat-Off Option

Heat Flow is not currently available on a Mega

Select either: Elapsed Time, Heat Flow or Sample Detection.

For Elapsed Time enter value in hours and/or minutes

Heat Flow

Not currently available on a Mega

NOTE:
Control Channel Probe
MUST be placed in the swing OR SAMPLE HOLDER

Only requires 1 SampleGuard probe.

This MUST be used to control the sample holder or swing temperature.

Either channel 1 or channel 2 may be used, ensure that the channel chosen is selected as the control channel in the run options.

Automatically detects dryness by monitoring the rate at which the solvent is evaporating.

Low solvent loading or if the lamps are turned off may cause Heat Flow to fail.

If failure occurs, select one of the other two options.

For very low solvent loading, requiring very little heat, then the following would be used:

Sample Detection

Requires both SampleGuard probes, Channel 1 to monitor the swing/holder temperature and Channel 2 in the centre well of the sample holder to monitor sample temperature.

Monitors the temperature difference between the 2 channels.

At the start, they are the same, but as the samples dry the temperature difference gets smaller.

When the temperature difference reaches the preset figure (Not user configured), the run is terminated.

Heat-Off Elapsed Time

This can be in a range of 0 (lamps off for the entire run) to 99 hours 59 minutes.

End-of-Run Option

This option is the elapsed time after which the run will be stopped.

End-of-Run Elapsed Time

Press **ENTER** and input the time after which you want the run to stop.

This can be in the range of 1 minute to 99 hours 59 minutes.

Pressure Control Regime

Press **ENTER** to display the **Select Pressure Control Option** drop down menu.

Use the **Up-Down** cursor keys to select the pressure option required.

Full Vacuum

Full Vacuum will take the chamber pressure down to the vacuum capability of the pump.

Controlled Pressure

When the **Controlled Pressure** option is selected, the **Controlled Pressure** field will be displayed.

Move down to this field using the **DOWN** cursor key and press **ENTER**.

Input the pressure you want the chamber to be limited to in the range of 0 to 500 mbar.

Dri-Pure

DRI-PURE reduces the vacuum over a predetermined period to 50 mbar, then goes to the control pressure as set by the user.

This feature is particularly useful in preventing bumping, (the violent boiling of solvents), resulting in solvents being expelled, which is a source of cross contamination of samples.

Bumping can also cause products to be deposited on the glass lenses of the Coolheat lamps, which eventually results in breakages.

Note that during the **DRI-PURE** cycle, which is approximately 40 minutes, the Coolheat function will be disabled.

Variable Dri-Pure

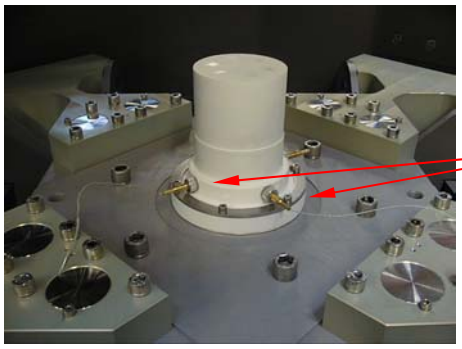
Variable Dri-Pure allows the user the option to set:

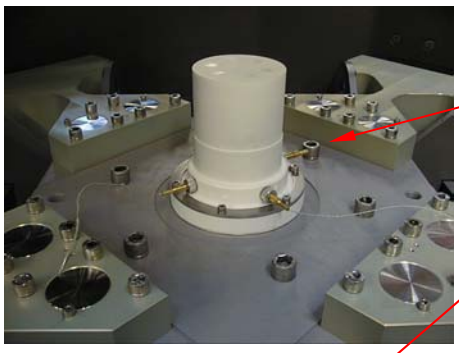
1) The pressure at which the vacuum ramp will start.

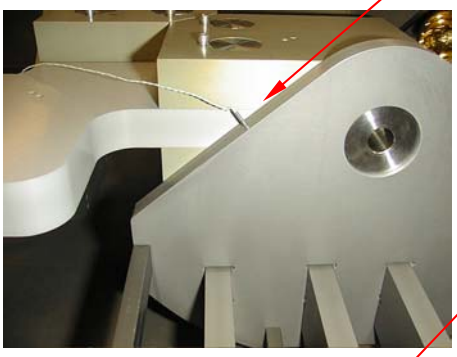
2) The pressure at which the vacuum ramp will end.

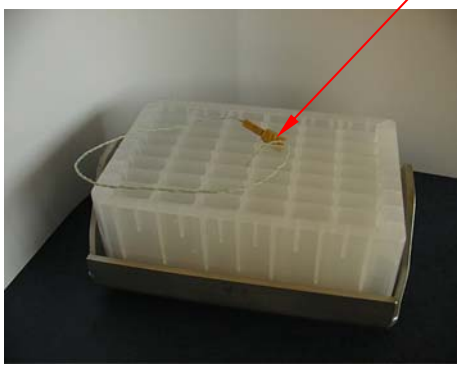
3) The total duration of the vacuum ramp.

4) Final Controlled Pressure.









5.7 How to use SampleGuard

SampleGuard is a dual channel temperature controller that operates when the rotor is spinning.

Thermocouple type probes are connected to the SampleGuard housing as shown.

One probe is used to control the sample holder temperature and the other the sample temperature.

The SampleGuard housing is stamped next to the connectors to identify channels 1 and 2.

The third connection is for a remote power supply to power SampleGuard to verify temperature calibration (refer to later notes).

Always ensure that channel 1 is used to monitor and control the sample holder temperature and channel 2 to control the sample temperature.

Always use channel 1 as the control channel as using channel 2 under these circumstances, could result in damage to thermo labile samples.

Depending on the solvents being evaporated and the conditions, significant cooling and/or freezing will normally occur.

Under these conditions using microtitre plates, it is advisable to position the sample probe in a sample well near the centre of the plate.

Since the central wells are surrounded by other frozen or cold wells, there will be a significant thermal drain.

Under these conditions, dryness may well occur in the outer wells whist the central samples remain in solution or frozen.

When positioning the sample probe, always ensure that the probe tip is located firmly at the bottom of the well, vial or tube.

The use of Genevac Heat Transfer Plates would prove to be beneficial in preventing this condition arising, by providing an even heat transfer to your samples.

Please refer to our "Options & Accessories Brochure" to get the best solution for needs.

Available in pdf format, as a download, from our web site:

http://www.genevac.co.uk/

Note that the term **TxD** indicates that the transmitter is not transmitting and will be displayed when the rotor is not rotating.

The control temperature can be changed during a run by pressing the **SETTINGS** key to display the **Run Data** screen.

Use the cursor keys to select the **SampleGuard Control Temperature** field and press **ENTER**.

Input the new value and press **ENTER** again.

The system will prompt you to confirm the change when you leave the **Run Data** screen.

Press **Y** for yes and **N** for no.

To verify the calibration of SampleGuard, remove the **Stuffer Plug** shown, connect the remote power lead and connect probes to channels 1 and 2.

With the lid open, immerse both probes in a beaker of water at approximately 40 degrees Centigrade.

Press the **START** key and verify the indicated temperatures against a calibrated digital thermometer.

The frequency of verification and record retention, should meet the requirements of your ISO/EN/BS 9000 series or NAMAS procedures.

On removal of the remote power lead, always ensure that the **Stuffer Plug** is replaced.

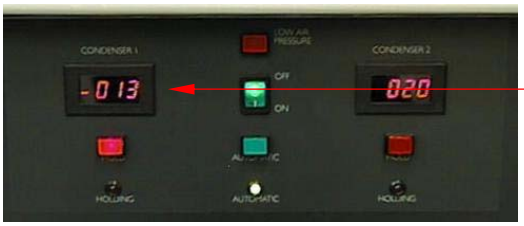
SampleGuard will not operate without the Stuffer Plug.

5.8 How to use the condenser

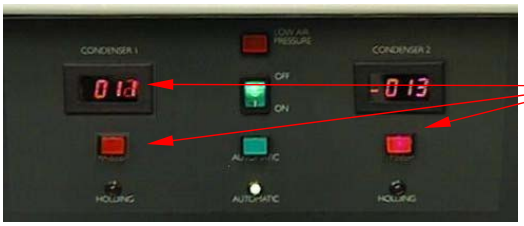
ENSURE THAT A SUITABLE RECEPTACLE IS CONNECTED TO THE DRAIN, PRIOR TO SWITCH ON, AS DRAINING OCCURS AUTOMATICALLY.

The automatic condenser (VC8000TA) is designed to ensure maintenance free and optimised condensing and that a fresh cryopump is always available.

The condenser starts in automatic mode when powered up (switched ON). This is indicated by the **AUTOMATIC** LED being illuminated.



When initially powered up **CONDENSER 1** starts its chilling cycle, indicated by a rapid drop in temperature on the display.



The cryopump pots automatically switchover during the run. The temperature indicators and **HOLDING** switch lamps reflect this.

Provision has been made to manually over-ride the automatic process.

After switchover the operator is able to hold the condenser on the current pot. This could be used to prevent switchover if the end of the run is imminent.

When the **HOLDING** button is pressed the **AUTOMATIC** LED will extinguish, the **HOLDING** LED and the **AUTOMATIC** switch will illuminate.

To re-enter automatic mode press the **AUTOMATIC** button, the **AUTOMATIC** button and the **HOLDING** LED will extinguish and the **AUTOMATIC** LED will illuminate. At which point the drain and switchover cycle takes place.

When flushing the condenser

Start venting the chamber prior to carrying out the flush.

This prevents flushing the whole chamber, which is undesirable.

5.9 How to start a run

This section will describe a typical evaporation run of DMSO.

In this example, two sets of eight 28 x 60 mm scintillation vials each containing 5 ml of DMSO were held in solid aluminium sample holders.

SampleGuard control temperature was set at 40 degrees centigrade and the pressure to full vacuum.

To prevent condensation, the chamber was preheated to 40 degrees centigrade.

Switch on the pump, evaporator and condenser.

Display the **Run Data** screen and input the following data.

Run Data Locked ..... ***No***

Next Run Number ***0***

Run Name ..... ***DMSO 28 x 60 mm tubes***

Sample Holder Type ..... ***Solid Aluminium 28 x 60***

Sample Volume ***5***

Solvent ..... ***DMSO***

SampleGuard Control Temperature ***40***

SampleGuard Control Channel ***1***

Coolheat Enable Pressure ***100***

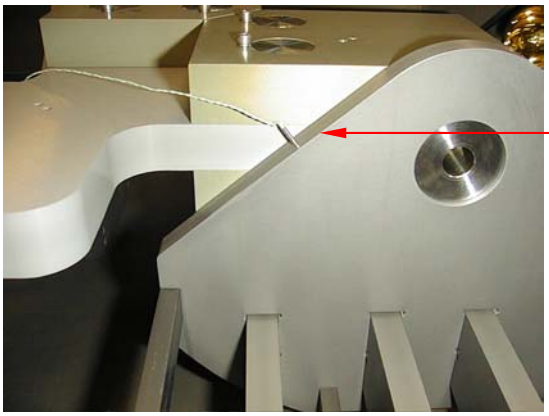
Chamber Temperature Control ***40***

Rotor Speed ..... ***Low***

Heat Off Elapsed Time ***01:40***

End of Run Elapsed Time ***01:40***

Controlled Pressure ***0***



Dispense the DMSO into the vials and load the sample holders into the sample swings.

Always use the upper level when loading partial rotor loads.

Always ensure that the vials, sample holders and sample swings are correctly and securely located.

Position the SampleGuard probe in its' location hole in the sample holder and connect to channel 1 on the rotor.

Position the sample SampleGuard probe in a central vial and connect it to channel 2 on the rotor.

Always ensure that the tip of the sample probe is located at the bottom of the vial.

Switch the lid selector to close and close the lid of the evaporator ensuring that no items will be entrapped by the lid.

Press the **START** key.

The system will indicate that the chamber is warming up.

This will take approximately twenty minutes.

When the chamber is up to temperature, the system will start automatically.

With aluminium sample holders of this thermal capacity, some time can be gained by preheating them in an oven to 40° C.

A brief discussion is given here to give the user a better understanding of the processes involved.

When the run is started, the pressure will drop steadily as air is evacuated from the chamber and condenser.

With the Coolheat lamps operating from 100 mbar and because the chamber has been pre-heated to 40° C, the sample holders soon reach the pre-set temperature.

The maintenance of the 40° C ceiling clearly shows the benefit of having and using SampleGuard.

As solvent starts to evaporate, the pressure drop will stop or reduce in rate.

The temperature of the sample drops due to evaporative cooling.

Provided there is sufficient vacuum, the drop in sample temperature will take place even though the Coolheat lamps are on.

This will substantially reduce the evaporation rate and the pressure and vapour flow will drop until a steady state is reached.

There is then normally a long period of constant pressure and vapour flow whilst the bulk of the solvent is evaporated.

As the solvent approaches dryness, the evaporation rate often reduces, causing the vapour pressure to drop.

This is particularly noticeable with 'oily' samples whose vapour pressure is very low.

At this point, the sample temperature will start to rise and reach the SampleGuard control temperature in a reasonably short time.

A few minutes after, the sample temperature reaches the control temperature, stop the system and inspect the samples.

Other evaporation run profiles are given in section 6.3 Optimising a run.

Notes on probe position and channel choice

- Use channel 1 to control the sample holder or rotor temperature, as this will always ensure that the sample temperature will never exceed the control temperature you set.
- Outer tubes or wells in microtitre plates invariably dry more quickly than central ones. This is because the central positions are surrounded by 'cold' neighbours.
- Choose central positions to be sure that all locations are 'dry' or an outer position if you are unsure of how long a particular run will take.
- The upper rotor has two diametrically situated holes for probes. Alternatively, use one of the holes in the sample holder as shown.
- Always use the same channel as the control channel, as once this is changed for a particular program, it will remain so.
- If you do change the control channel for a particular run, this may cause confusion between different users and could give rise to product damage.
- Periodically inspect the probe ends and connections for damage.

6 Getting the best from your system

6.1 Routine Checks

For high boiling point solvents such as DMSO, NMP, DMF and DMI the best evaporation rates will only be achieved at pressures better than 0.5 mbar.

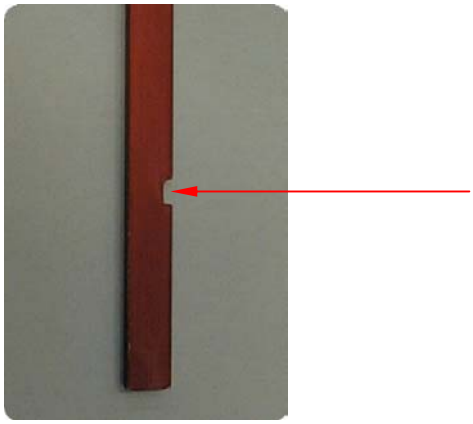
Check all clamped joints on a regular basis to ensure that they are secure.

Always ensure that the condenser pots are drained before every run.

Flush the condenser pots with a suitable solvent at regular intervals.

Check the catch pot connected to the pump exhaust on a regular basis and drain as necessary

Never pump a heated condenser containing traces of liquid DMF, DMSO or NMP, as this will contaminate the pump oil.



Check the pump oil level initially on a daily basis until a usage pattern has been established and then once weekly (CVP Only).

Ensure that the oil level is **within** the notch on the dipstick and no lower than the middle of the notch (CVP Only).

Keep a weekly log of the time taken for your system to reach full vacuum, as this data will give you an indication of seal ageing and wear.

With high boiling point solvents, it is advantageous to pre-heat aluminium sample holders before commencing a run to increase evaporation speed.

Use the link run facility when evaporating solvent mixtures with large differences in boiling point (refer to 6.3 Optimising a run).

6.2 Problem prevention

Condensation

Condensation of the evaporating solvent will occur when the solvent vapour temperature is above that of the chamber walls.

This is most likely to occur with commonly used solvents such as NMP, DMI, DMSO and possibly DMF.

To prevent this, it will be necessary to pre-heat the chamber.

To do this, remove the sample holders and set the Minimum Chamber Temperature field to 40 degrees on the **Run Data** screen and start the run.

The chamber will take approximately 20 minutes to reach this temperature.

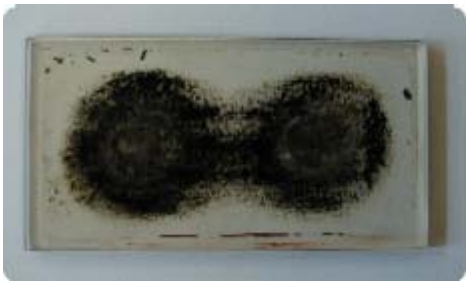
Note that the Coolheat lamps will not operate during this pre-heating cycle.

If condensation occurs unexpectedly, immediately switch off the lamps by entering 0 into the Heat of Elapsed Time field on the **Run Data** screen.

Pre-heating the chamber is not recommended when evaporating volatile solvents such as TFA, acetonitrile or methanol.

TFA Creep

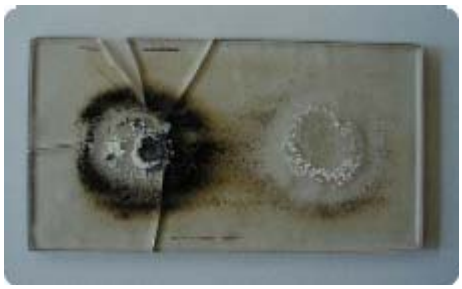
TFA exhibits the property of ‘creeping’ which, is the movement of the TFA in liquid phase up the inside of the tubes, vials or microtitre plates.



Problems can arise if solvent containing product is deposited in this way on the top face of plates.

During rotation of the rotor, solvent and product are thrown onto the Quartz glass windows in front of the lamps.

Whilst the solvent evaporates, the product becomes carbonised by the heat from the lamps and form sites for crack propagation to take place.



Inspect glasses at regular intervals and clean with a lint free cloth and acetone.

If the contamination becomes excessive and carbonised as shown, contact Genevac Service.

Genevac manufacture a range of specialised sample holders to protect the Quartz lenses. Call Genevac Sales for details.

Bumping and spitting is unpredictable and may occur with any solvent or mixture.

Limiting the chamber pressure

- Bumping must be avoided, as it is a potential source of cross contamination between samples.
- Bumping can also cause product to be deposited on the glass lenses as previously described

Use the Dri-Pure option on the drop down menu under **Pressure Control Regime** on the **Run Edit** screen.

This option incrementally reduces the pressure and automatically sets the rotor speed to high.

6.3 Optimising a run

This section will describe some of the general principles applicable to optimising evaporation rates by exploiting the flexibility of the Series II control software.

Pressure control can be used to significantly increase the evaporation rate of mixtures of greater than 30% water when contained in glass tubes and beakers.

When evaporating aqueous mixtures at pressures of less than 4 mbar, ice can form and extend the evaporation time.

At a pressure of 6 mbar, ice crystals are not formed and the time required for evaporation can be reduced by up to 30%.

Mixtures of water and methanol in deep well microtitre plates however, respond entirely differently as shown by the graphs shown on the next page.

At full vacuum, a reasonable evaporation rate is achieved whilst at 8 mbar; the time required for evaporation is increased significantly.

Linking Runs

When evaporating 40 ml fractions in 24 x 150 mm glass tubes or larger volumes in beakers, typical evaporation times for water - acetonitrile mixtures can be in excess of 8 hours.

A reduction can be achieved by setting the SampleGuard control temperature to 60 degrees centigrade for a defined period.

Provided the period was not excessive, the sample temperature is likely to remain below 40°C, even though the Coolheat lamps remain on as result of evaporative cooling.

After this period, a second or a number of successive runs can be linked at reduced SampleGuard temperatures and different pressures.

Some experimentation would be necessary to ensure that safe sample temperatures are not exceeded.

7 Care of your system

The routine checks and the day to day care points you should be aware of, were detailed in section 6.1 Routine checks.

The remainder of this section will address the less frequent system checks.

7.1 How to clean the chamber

As mentioned in section 6.2 Problem Prevention, TFA creep can give rise to debris being deposited on the inside of the chamber and on the Quartz glasses.

Periodic inspection of the glasses, the inside of the chamber and rotor is recommended to avoid an unacceptable build up of potential contaminants.

Excessive build up of debris on the pivoting faces of the sample swings and rotors, can give rise to sample swings sticking in the out position and result in product loss.

Inspect the sample swings on a weekly basis for free movement and the inside of the chamber and glasses for build up of debris.

Clean with acetone taking care to avoid contact with the outside paintwork and accessories of the chamber.

Use the accepted Health and Safety precautions in using acetone in this manner.

- Seals and bearings will wear with use.
- Over a period of time, this will result in a gradual decline in performance of your system.
- Lack of any maintenance at all, will result in unscheduled breakdowns and costly down time.
- Planned preventative service and maintenance, will keep your system operating at peak performance.
- Please refer to section 12 Useful Information for contact details.
- Keep a weekly log of the time taken for your system to reach full vacuum and the full vacuum achieved.
- This data will give an indication of the performance of your system.

7.2 Maintenance and Service

Every effort has been made during the design and manufacture of your system to assure the build quality and reliability of your system.

Over a period of time however, there will be some degree of wear and ageing of the seals and bearings in the chamber, condenser and pump.

The extent of wear and ageing will depend on the utilisation of the system, the severity of temperature cycling and the nature of the solvents being used.

With some solvents, pin hole corrosion may occur in the connecting tubes which will result in a decline in performance.

Drops in performance are manifested in the time taken to reach full vacuum, the level of full vacuum and a general decline in evaporating efficiency.

In order to keep your system at peak performance and to avoid costly and unscheduled down time, we strongly recommend some form of planned maintenance.

Because of the complexity of changing parts in the field, a high level of skill is required to maintain a complete system.

To this end, Genevac can offer a range of preventative maintenance, service and breakdown contracts to cater for your particular needs.

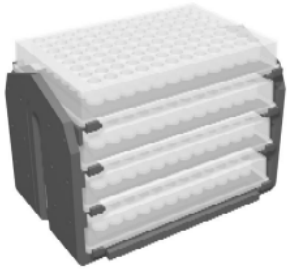
7.3 Additional equipment

There may be future applications for which your current range of sample holders are not adequate.

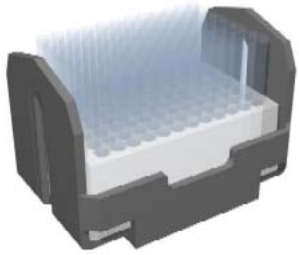
The following accessories are just an example of the many ways in which Genevac can assist you in developing your system for the future.

For further information or to discuss any ideas you may have, please call Genevac Sales.

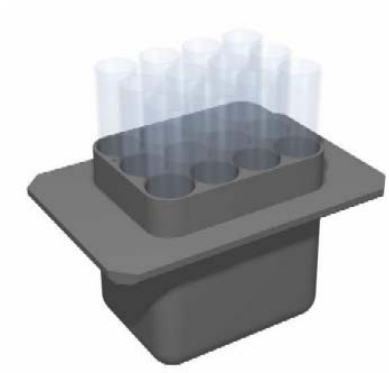
- **All sample holders are of a solid aluminium construction and black anodised to improve heat absorption**
- **Maximum contact area provide good physical support, optimum heat transfer and even heat distribution**
- **Solid aluminium tube holders provide even heat distribution for uneven drying loads**



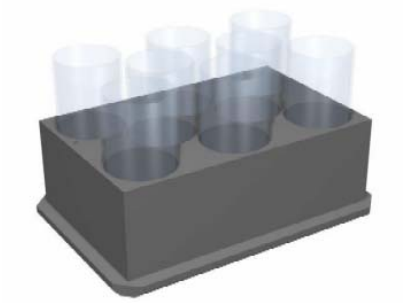
FastStack for shallow well plates



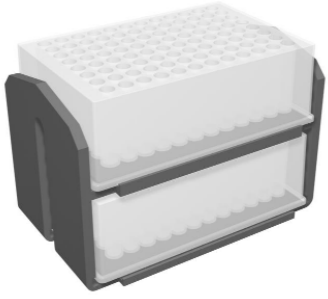
Side Bridge



Medium length tube holder



Short tube holder



FastStack for deep well plates

Flask holder

7.4 Moving your system

These notes are included to assist you in moving your system to another area.

Before moving your system, the following key points should be addressed.

- Ensure that there is sufficient floor space to position your system.
- Ensure that there is an adequate power supply.
- Ensure that there is adequate ventilation.
- Ensure that there is sufficient clearance for adequate ventilation of the pump and condenser.
- Ensure that provision has been made for the drainage of condenser solvents and the pump exhaust.
- Ensure that the condenser pots are drained and flushed.
- Ensure that the sample swings are removed form the rotor.
- Ensure that all the clamps, seals, tubes, cables ***and these instructions*** are retained together.

The system is provided with wheels for easy movement for access and service.

It is also provided with feet which should normally be screwed down to prevent excessive movement during operation.

If the load is 300g or more out of balance, the vibration sensor will close the system down automatically.

If the feet are not screwed down, this can occur with considerably lower out of balance loads.

Feet shown in the retracted position

8 Fault Finding

This section will describe potential errors and faults that may occur and lists their probable causes.

The symptoms are listed on the left hand side of the page and the source of solutions on the right.

Always check that you have called up the correct run from the Select Run screen.

Temperature	Probable cause
• The sample temperature exceeds the control limit.	• The wrong control channel has been selected or the probes have been connected to the wrong channel (refer to section 5.7 How to use SampleGuard).
• The Coolheat lamps will not switch on.	• The Coolheat enable pressure has been set incorrectly (refer to section 5.6 Coolheat Enable Pressure). • The lamps have not been enabled (refer to section 5.5 Lamp Layer Menu). • The heat off elapsed time has not been specified or specified incorrectly (refer to section 5.6 Heat Off Elapsed Time).

Pressure	Probable cause
• The system will not reach full vacuum.	• The chamber pressure may be controlled (refer to section 5.6 Controlled Pressure). • Dri-Pure may have been selected (refer to section 5.6 Dri-Pure). • There may be a leak in the system (refer to Leaks below).

General	Probable cause
• The system did not stop when I expected it to.	• You may have inadvertently linked a run (refer to section 5.6 Next Run Number). • You may have inadvertently looped a run (refer to section 5.6 Next Run Number).
• The run is taking far longer than I expected.	• Check that the condenser pot in use has been drained (refer to section 5.8 How to use the condenser).
• The system has shut down and I have an imbalance alarm prompt.	• Check the sample holders and contents for weight differences of greater than 50g (refer to section 4.1 Safe loading).

Specific	Probable cause
• Suspected leak - pressure of no better than 5 mbar. (Be sure to check that you have **NOT** limited the pressure setting. Check the pressure setting regime before proceeding any further).	• Check the security of all the clamps on the system. If these are obviously tight and in good condition, apply the following procedure. • Use a process of elimination to isolate the leak (you will need a separate vacuum gauge with a resolution of better than 0.5 mbar - contact Genevac for details). • Disconnect the pump from the connecting tube and connect the vacuum gauge transducer directly to the vacuum port. • Start the pump and note the pressure after three quarters of an hour. This should be better than 1mbar. If not, contact Genevac Service for advice. • If the pump is satisfactory, reconnect the connecting tube from the condenser and disconnect the tube at the condenser end. • Connect the vacuum transducer directly to the end of the tube and switch the pump on. • If the pressure is no better than 1 mbar, replace the tube. • If the tube is satisfactory, reconnect the tube to the condenser and restart the system. • If the same conditions prevail, contact Genevac Service for assistance.

Condenser	Probable cause
• Condenser not getting to temperature (- 40° C).	• Contact Genevac Service for assistance.

Electrical	Probable cause
• No power to any part of the system.	• Check the circuit breaker on the mains supply to the system and reset if necessary. • Check switches. • If the fault persists, contact Genevac Service for assistance.
• No power to the pump and condenser.	• As above
• No power to the chamber.	• As above
• Lid will not open - system powered up.	• Contact Genevac Service for assistance.

9 Technical data

	Mega 980 Max	Mega 1200 Max
Mechanical data		
Max rotor speed	900 (Low Speed) 1100 (High Speed) 1100 Dri-Pure	810 (Low Speed) 990 (High Speed) 990 Dri-Pure
Max Force	300-450G	300-450G
Drive system	Direct	Direct
Operation imbalance	200g	250g
Max load	Refer to Page 8	Refer to Page 8
IR lamps number	12	24
Weight	1000 kg	1300 kg
Condenser		
Condenser temperature		
Minimum	-45°C	-45°C
Maximum	+60°C	+60°C
Vacuum condenser capacity	2 x 8.0 litres	2 x 8.0 litres
Exhaust condenser capacity	2.5 litres	2.5 litres
Condenser level detector	No	No
Rapid defrost	Yes	Yes
Condenser chamber	316 Stainless steel	316 Stainless steel
Condenser drain valve	Stainless steel/PTFE	Stainless steel/PTFE
Vacuum system		
Pressure display/resolution	0 -1000 mbar	0 -1000 mbar
Vacuum control	0 -1000 mbar	0 -1000 mbar
Dri-Pure	Yes	Yes
Auto vacuum vent valve	Yes	Yes
Ultimate system vacuum	0.4 mbar	0.4 mbar
Dimensions		
Evaporator (W x D x H)		
Lid Closed	1382 x 1084 x 1371 mm	1600 x 1304 x 1371 mm
Lid Open	1382 x 1084 x 2313 mm	1600 x 1304 x 2521 mm
Electrical		
Power supply	230V, 50Hz, single phase, 25A, 5.8kW 208V, 60 Hz, single phase, 25A, 5.8kW	

Environment

The following figures apply:

Operating

Ambient Temperature:	15°C to 30°C
Relative Humidity:	10 – 60%
Altitude:	Sea Level to 1,600m

Storage

Ambient Temperature:	-10°C to 60°C
Relative Humidity:	10 – 80%
Altitude:	Sea Level to 12,000m

10 EC Declaration of Conformity

We Genevac Limited

Declare that this product:

Mega Series II Evaporating System

Complies with the relevant Essential Health and Safety Requirements of the European Machinery Directive (89/392/EEC as amended by 91/368 EEC and 93/44/EEC). The EMC Directive 89/336/EEC and the Low voltage Directive 73/23/EEC.

Conformity is demonstrated by compliance with the following Harmonised European Standards:-

EN 60204-1:1998, Safety of machinery– Electrical equipment of machines-Pt 1 General Requirements

EN 294: 1992, Safety of machinery– Safety distances to prevent danger zones being reached by upper limbs.

EN 1088: 1996, Safety of machinery. Interlocking devices associated with guards. Principles of design and selection.

BS EN ISO 12100 pts 1 & 2:2003, Safety of Machinery - Basic concepts, general principles for design.

BS EN 50082-1: 1998, Electromagnetic compatibility – Generic immunity standard.

BS EN 61010-2-020: 1995, Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for laboratory centrifuges.

11 Safety

WARNING!

THIS SYSTEM MUST BE EARTHED

THIS EVAPORATOR IS A SAFETY CLASS 1 PRODUCT ACCORDING TO IEC CLASSIFICATION. IT MUST NEVER BE USED WITH ANY INTERRUPTION TO THE SAFETY EARTH CONDUCTOR. IT IS AN INSTALLATION CATEGORY II PRODUCT AND IS INTENDED TO OPERATE FROM A NORMAL SINGLE-PHASE SUPPLY.

THIS EVAPORATOR HAS BEEN DESIGNED TO BE USED IN A POLLUTION DEGREE 1 ENVIRONMENT (NO POLLUTION, OR ONLY DRY NON-CONDUCTIVE POLLUTION).

ANY MAINTENANCE OR REPAIR OF THIS PRODUCT SHALL BE CARRIED OUT BY GENEVAC PERSONNEL (OR APPROVED REPRESENTATIVES OF GENEVAC) USING ONLY APPROVED SPARE PARTS

12 Warranty Statement

This product is guaranteed for period of 12 months from the date of delivery to site. In the unlikely event of any defect arising due to faulty materials or construction resulting in system failure, the unit will be repaired free of charge. This to include all labour and component costs incurred.

This warranty is subject to the following provisions:

1. System must be sited, installed and operated in accordance with operator instruction manual.
2. Unit only used for purpose it was sold, and in accordance with Genevac published compatible solvent list.
3. Regular cleaning and preventative maintenance schedule to be adhered to as detailed in operator's manual.
4. Warranty does not cover accidental damage, misuse, modifications or inappropriate repair by untrained personnel.
5. Warranty does not cover consumable items*

Failure to adhere to the above would result in the costs of repairs being charged.

* Consumable Items: Sample Guard thermocouple probes
Control fuses

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United States of America

Sales and Service Hotline

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Fax (1) 845 267 2212

Email: atlas@genevacusa.com

13 Useful information

If you need to contact Genevac for assistance, use either the telephone or fax Hotlines given.

It will always help Genevac Service if you have the serial numbers at hand for the components of your system

If you need to contact Genevac Sales for information on Service Contracts or products, use the telephone or fax Hotlines given.

Alternatively, Email or visit our web site.